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Rubber-or-Plastics-Coated Fabrics - Determination of Fogging Characteristics of Trim Materials in the Interior of Automobiles

(ISO 6452:2007, IDT)

橡胶或塑料涂覆织物 汽车内饰材料雾化性能的测定

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WARNING - Persons using this Document should be familiar with normal laboratory practice. This Document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

1 Scope

This Document specifies a test method which is intended to determine the fogging characteristics of rubber-or-plastics-coated fabrics that are used as trim materials in the interior of motor vehicles.

This Document may also be applicable to fluid, pasty, powdered or solid raw materials which are the basis for such trim materials or from which the materials are manufactured. The method may also be applicable to other materials and finished products.

This Document is applicable to the measurement of fog condensate on glass surfaces within the limits of the test conditions. This test will not measure or cannot measure accurately those cases in which:

--- the surface tension of the condensate is low, resulting in early coalescing into a thin transparent film;

--- the condensate is present in such a large quantity that the droplets coalesce and form a heavy oily/clear film (this heavy film gives false readings).

In such cases, the gravimetric method is preferred.

2 Normative References

The provisions in following documents become the essential provisions of this Document through reference in this Document. For the dated documents, only the versions with the dates indicated are applicable to this Document; for the undated documents, only the latest version (including all the amendments) is applicable to this Document.

ISO/TR 9272 Rubber and Rubber Products – Determination of Precision for Test Method

Standards

3 Terms and Definitions

For the purposes of this Document, no terms and definition apply.

4 Principle

A test piece is heated in a glass beaker. Any volatile constituents are condensed on either a cooled glass plate or a disc of cooled aluminum foil.

The fogging value *F* is calculated as the quotient, in percent, of the reflectometer value for the glass plate with fogging condensate and the reflectometer value of the same glass plate without fogging condensate.

The mass of the condensable constituents *G* is given by the difference between the masses of the aluminum foil disc with and without fogging.

5 Materials

5.1 Thermal-transfer fluid

For the thermostatically controlled bath (6.1). The fluid shall be temperature stable and preferably water-soluble for easier cleaning. A suitable fluid is a modified polyhydric aliphatic alcohol.

5.2 Glass-cleaning detergent

Of a non-alkaline type.

5.3 Diisodecyl phthalate (DIDP)

Obtained from the stated source (see Annex C).

6 Apparatus

6.1 Thermostatically controlled bath

Designed to operate at up to 130°C. Safety devices shall be fitted to prevent overheating. The circulation system, the bath capacity and the heating system shall be such that the temperature can be kept constant to within ± 0.5°C throughout the bath. The agitation of the bath shall be done at a slow and uniform speed

NOTE 1: It is very important to keep the temperature correct, as tests have shown that only a 0.5°C difference can be seen in the test results.

NOTE 2: Some heaters/circulators have a centrifugal pump in the bottom, pumping the liquid at high speed around the bath. The beakers (6.3) will then have the liquid passing them at different speeds and this will cause different temperatures in different beakers.

The bath shall be designed so that, after placing the beakers (6.3) in the bath, the temperature does not drop than 5°C, and the test temperature is regained after no more than 20 min. The minimum distance the beakers and the walls shall be 30 mm and between the bottom of the bath and the beakers 60mm.

The bath shall be equipped with a device indicating the distance between the bath fluid and the lower surface of the glass plate (6.6). This distance shall be (60 ± 2) mm.

6.2 Cooling plates

Designed to be placed on the glass plates (6.6) to keep them cool. The cooling plate shall be hollow and made of corrosion-resistant metal, with the side facing the glass plate made of aluminum. They shall have two cooling-water connections located so that the cooling water flows through the whole of the interior of the plate. The surface in contact with the glass plate shall be flat. The mass of a cooling plate filled with water shall be at least 1 kg, to overcome the buoyancy of the beaker (6.3) in the bath. The whole of the weight of the cooling plate shall rest on the beaker. A separate cooling plate shall be used for each beaker.

The cooling plates and the associated water thermostat shall be designed so that the mean water temperature is 21°C and the difference in temperature between the inlet and outlet does not exceed 1°C.

6.3 Flat-bottomed beakers

Of heat-resistant glass, minimum mass 400 g, with the dimensions shown in Figure 1.

9 Procedure

9.1 Cleaning

9.1.1 General

Only touch the beakers (6.3) on the outer surfaces. Do not touch the glass plates (6.6) or the metal rings (6.4) with bare hands; use gloves (6.13) or tongs.

After the glass plates have been cleaned and dried, make a visual check that the plates are free of scratches and other defects; if they are not, discard them.

After cleaning, store all items, the beakers upside-down, in a dust-free environment at room temperature until the measurements are made.

9.1.2 Cleaning with a dishwasher

Wash the sealing rings (6.5), beakers and metal rings twice in a dishwasher (6.11) with glass-cleaning detergent (5.2). If the dishwasher is not connected to a deionized-water supply, rinse the cleaned equipment in deionized water.

Prior to each use, clean all glass plates twice in the dishwasher at 80°C using a glass-cleaning detergent. If the dishwasher is not connected to a deionized-water supply, rinse the cleaned glass plates in deionized water at room temperature and dry them in an upright position

It is recommended that the glass plates are not reused more than a few times, since microscopic scratches may affect the rate of deposition of any vapors and hence the reproducibility of the method. Discard any glass plates that have surface scratches or abraded spots.

NOTE: Tests have shown that it is very important to use a neutral or acid detergent as alkaline detergent affects the glass surface and the reflectrometric fogging value increases

9.2 Control tests

In parallel with every fogging test, carry out a control test to determine the fogging value *F* of the reference liquid DIDP. For this purpose, add (10±0.1) g of DIDP to a beaker, taking care not to moisten the inner wall of the beaker. Place the beaker with the DIDP in the (100±0.5) °C constant temperature bath (6.1), using a different position for each test. After the test period of (180±3) min at the bath temperature of (100± 0.5) °C, the fogging value shall be within ±3 % units of the value stated on the bottle. If this is not the case, check the test conditions.

Carry out the same procedure with DIDP when determining the mass of the condensable constituents *G*. After the test period of (16±0 .2) h at the bath temperature of (100±0.5) °C, the mass of the condensable constituents shall be within ±0.25 mg of the value stated on the bottle. If this is not the case, check the test conditions.

NOTE: It is very important not to moisten the walls of the beaker with the DIDP when handling the

Place the beakers prepared in this manner in the thermostatic bath held at (100±0.5) °C.

NOTE 1: Other temperatures may be agreed upon by the interested parties.

Place a filter paper (6.7) on each glass plate (to prevent scratching of the surface of the glass plate), followed by a cooling plate (6.2). Set the temperature of the cooling water at (21±1) °C.

NOTE 2: Other temperatures may be agreed upon by the interested parties.

Ensure that the distance between the level of the bath fluid at the test temperature and the lower surface of each glass plate is (60±2) mm.

NOTE 3: When changing the test temperature, check the level as the volume of the liquid changes with temperature.

9.5.2 Determination of fogging value *F*

Keep the beakers in the thermostatic bath for a period of (180±3) min.

NOTE 1: Other periods may be agreed upon by the interested parties.

Then raise the glass plates without touching the fogging condensate and store in a horizontal position, with the fogging condensate upwards. in a dust- and draught-free atmosphere at (23±2) °C and (50±5) % RH. Do not expose the glass plates to direct sunlight. Carry out the measurement of the reflectometer value after a storage period of (60±6) min.

NOTE 2: Other periods may be agreed upon by the interested parties.

Prior to measuring the fogging condensate with the reflectometer, check visually that the condensate does consist of droplets, and does not consist of a continuous film or contain crystals or other structural features. Do not measure reflectometer values of such condensates since they give misleading results. If such condensates are formed, mention this fact in the test report. If necessary, repeat the test.

Recalibrate the reflectometer. Then place the glass plate on the white filter paper backing, and the spacer on the glass plate.

Place the reflectometer over the guide markings and take four readings R_{11}, R_{12}, R_{13} and R_{14}.

Measure the reflectometer values for two test pieces. If the fogging values obtained deviate by more than 10 % from the mean value, test a further two test pieces and calculate the mean value of only those which are within ±10 % of the mean.

9.5.3 Determination of mass of condensable constituents *G*

Allow the beakers to remain in the thermostatic bath for (16 ± 0.1) h. After this period, carefully remove the aluminum discs, on their sealing rings, and store them with the fogged side up in a desiccator for 3.5 h to 4 h. Do not over-fill the desiccator. Do not expose the discs to direct

Annex B

(Informative)

Guidance on Using Precision Results

B.1 The general procedure for using precision results is as follows, with the symbol $|X_1-X_2|$ designating a positive difference in any two measurement values (i.e., without regard to sign).

B.2 Enter the appropriate precision table (for whatever test parameter is being considered) at an average value (of the measured parameter) nearest to the "test" data average under consideration. This line will give the applicable *r*, (*r*), *R* or (*R*) for use in the decision process.

B.3 With these *r* and (*r*) values, the following general repeatability statements may be used to make decisions.

B.3.1 For an absolute difference:

The difference $|x_1-x_2|$ between two test (value) averages, found on nominally identical material samples under normal and correct operation of the test procedure, will exceed the tabulated repeatability *r* on average not more than once in twenty cases.

B.3.2 For a percentage difference between two test (value) averages:

The percentage difference:

$$\frac{|X_1-X_2|}{(X_1+X_2)/2}\times 100 \qquad \cdots\cdots(B.1)$$

between two test values, found on nominally identical material samples under normal and correct operation of the test procedure, will exceed the tabulated repeatability (*r*) on average not more than once in twenty cases.

B.4 With these *R* and (*R*) values, the following general reproducibility statements may be used to make decisions.

B.4.1 For an absolute difference:

The absolute difference $|x_1-x_2|$ between two independently measured test (value) averages, found in two laboratories using normal and correct test procedures on nominally identical material samples, will exceed the tabulated reproducibility *R* not more than once in twenty cases.

B.4.2 For a percentage difference between two test (value) averages:

The percentage difference:

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